



# Food Webs

NC Standard  
LS.8.2.2 &  
LS.8.2.4

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## Activity Description & Estimated Class Time

In these two to three 50-minute lessons, students will build models to explain the flow of energy within food chains and food webs. Students will also build food webs and explore different relationships among organisms using their own school's data and other data points provided by iNaturalist, a citizen science project that facilitates the mapping and sharing of observations of biodiversity across the globe.

## Correlations to NC Science Standards

LS.8.2.2 Construct an explanation to summarize the relationships among producers, consumers, and decomposers including the positive and negative consequences of such interactions including: coexistence and cooperation, competition (predator/prey), parasitism, and mutualism.

LS.8.2.4 Use models to explain how the flow of energy within food webs is interconnected with the cycling of matter (water and carbon).

## Learning Target

Students will demonstrate knowledge and understanding of the following ideas and content:

- Energy begins with the sun and flows through producers to consumers.
- There are different levels of consumers within a food web.
- There are many relationships among organisms that have both positive and negative consequences

## Brief Science Background

All living things get the energy they need to live and grow from some form of food. In a community of living things, called an ecosystem, the organisms in that community get their food and their energy from the environment and each other. The flow of energy that starts with the sun and goes from organism to organism follows a “food chain.”

Organisms in food chains have names that identify where they are located in the food chain. Organisms that receive energy directly from the sun are producers. They use energy from the sun to produce their own energy. The first organisms that consume the producers are primary consumers. Secondary consumers eat primary consumers and may eat producers as well. Tertiary consumers may eat both primary and secondary consumers, while some eat producers also. Every ecosystem has one or more food chains. When those food chains are interrelated, it is called a food web.

Within an ecosystem, organisms are constantly interacting. These interactions among the organisms generate stability within ecosystems, can facilitate or restrain growth, can enhance or limit the size of populations, can maintain the balance between available resources and those who consume them, and can change both biotic and abiotic characteristics of the environment. Predation, competition, parasitism, mutualism, and commensalism are all examples of interactions among organisms.



## Part 1 — Food Chains and Food Webs

### Materials

#### Materials for the whole class

- Food Chain Cards
- Simple Food Chain (SD 1)

#### Materials groups of 2 students

- Pack of Food Chain Cards (12 cards)
- Food Chain and Food Web Student Activity Sheet (SD 2)

### Procedure

1. Hand out materials to groups of students. Have students place the pictures into two groups: producer and consumer. Students may need to review that a producer is an organism that produces its food and a consumer is an organism that consumes its food.
2. Ask students, “What characteristics of your organism(s) placed them into those particular groups?” and “Was there any card that didn’t fit into a group? If so, explain why you think it did not fit into a group.”

**The sun is often difficult for students to place into a group. Some students may place it with the producers and state that the sun provides energy for them.**

3. Display the Simple Food Chain (SD 1) and ask students to create a simple food chain. Explain that each of their cards has been identified as an herbivore, carnivore, or omnivore. Discuss with students that an herbivore is an animal that only consumes plants, a carnivore is an animal that only consumes animals, and an omnivore consumes both plants and animals. Have students draw or write the names of the organisms from the food chain they created on their food chain and food web student activity sheet (SD 2).
4. Ask students, “What do you think the arrows in a food chain represent? and “What is the purpose of including the sun in this food chain?”  
**The arrow represents the direction the energy flows in the food chain. The arrow goes from the food source to the mouth that eats it. The sun provides the initial energy for the food chain.**
5. Explain to students that organisms in food chains have names that identify where they are located in the food chain. Organisms that receive energy directly from the sun are producers. They produce their energy. The first organisms that consume the producers are **primary consumers**. **Secondary consumers** eat primary consumers and may eat producers as well. **Tertiary consumers** may eat both primary and secondary consumers, while some eat producers also. Have students label each organism in their food chain as a producer, primary consumer, secondary consumer, or tertiary consumer.
6. Have students add another organism card to their food chain. Have them state what type of organism it is (producer, primary consumer, secondary consumer, or tertiary consumer) and explain their reasoning.
7. Explain that they have begun to create a food web and that a food web is made up of different food chains within an environment. A food web describes the many species and interactions within an ecosystem. Have students create a food web with

**Procedure cont**

all of their cards and draw it on SD 2. Remind students to pay close attention to the direction of the arrows.

8. Have students rotate to different groups and look at the other food webs. Hold a group discussion about the similarities and differences among the food webs. **The students all have the same set of cards. There will be some similarities between the food webs, but there will also be differences depending on how the group put their food web together.**

**Content Connection**

1. Explain to students that every living thing plays a role in the food web. When a certain species, whether producer or consumer, is removed it can have a major impact on the food web. The impacts on individual organisms can change depending on the ecosystem.
2. Tell students one of the organisms in their food web has been wiped out by disease. Have them remove a card of their choosing from their food web.
3. Ask students:
  - a. What happens to the food web?
  - b. What happens to the organisms that consume the one that was removed?
  - c. What happens to the organisms consumed by the one that was removed?

**Many organisms in the food web will be impacted when an organism is wiped out. The organisms that consume the missing could starve or have to find another food source. The organisms that are consumed by the missing may become overpopulated in the area because they do not have as much predation.**

## Part 2 — Exploring Your School Grounds

**Materials****Materials for the whole class**

- Ability to project iNaturalist website.

**Materials groups of 2 students**

- Computer with internet access
- Food Chain and Food Web Student Activity Sheet (SD 2)
- School Ground Observation Sheet (SD 3)

**Procedure**

Adapted from Exploring the Biodiversity of My Schoolyard, published by University of California, Bakersfield.

1. Project [www.iNaturalist.org](http://www.iNaturalist.org) for the class to see. Explain that iNaturalist is an online network used by naturalists, citizen scientists, and biologists to share observations of biodiversity across the globe.
2. Select **Explore** at the top of the page.
3. Enter your school's location in the **location** field, click **Go**, and display the map view. Explain that each pin is a data point. Ask students, "Are there a lot of observations? Why or Why not?" and "Why would it be important to document the biodiversity on the school grounds?"

**Since people are not allowed to freely wander around school grounds while school is in session it limits the amount of time people can document species. The geography**



in your location makes it easy or hard to make observations and there may be a lot or very little interesting wildlife in your area.

It is difficult for naturalists and scientists to have access to the school grounds so students need to document the biodiversity. It is also difficult to discern changes in an environment if there is not a baseline record of what lives and grows there. Other reasons to document biodiversity on school grounds include: wildlife may need protection, to understand the natural surroundings, and enjoyment.

4. Give each student a School Ground Observation Sheet (SD 3) and have them get out SD 2 from the previous lesson.
5. Together as a class predict what type of producers, consumers, and decomposers they may find on the school grounds.
6. Take students outside for 20 minutes or more, and have them document the schoolyard biodiversity. Have them look up, down, and all around. Remind students that each organism is a new observation.

If you would like, students can use the Seek app (designed by iNaturalist) to help them document their findings on SD 3. If your students are over 13, they may also use the iNaturalist app after going through proper training to ensure proper data collection. Training can be found on [iNaturalist.org](http://iNaturalist.org).

7. Once back inside, have students share their observations with the class. Together discuss:
  - a. What producers, consumers, and decomposers were found that were on their original list?
  - b. Why do they think some of the organisms on their original list were not spotted?

Some animals aren't out at the time of day. Some animals are shy when there are people around. Some wildlife is hard to capture because it is too small, too big, or too fast.
  - c. What organisms were not on the list?
  - d. What could be another way to capture data to help fill in your food web?

Other ways include using camera traps, collecting data at different times of the day, and monitoring the schoolyard across the school and calendar year to account for seasonal changes.

8. Have students create a food web with all of the class observations.
9. Now have the students login to [www.iNaturalist.org](http://www.iNaturalist.org). Select **Explore** at the top of the page. Enter the school's location in the **location** field, click **Go**, and display the map view. Have students use the iNaturalist data points to add to their food web.
10. Once the food webs are complete, have students write a paragraph describing how their food web works and what might impact their food webs, both positively and negatively.

1. Have students identify a local native species that they would like to see in their school yard.
2. Students should then discuss what habitat the species would need to have and what are some simple habitat additions/improvements that they could make on their school grounds to create a welcoming environment for the species.



## Part 3 — Exploring Different Relationships

### Materials

Materials groups of 2 students

- Computer with internet access
- Food Chain and Food Web Student Activity Sheet (SD 2)

### Procedure

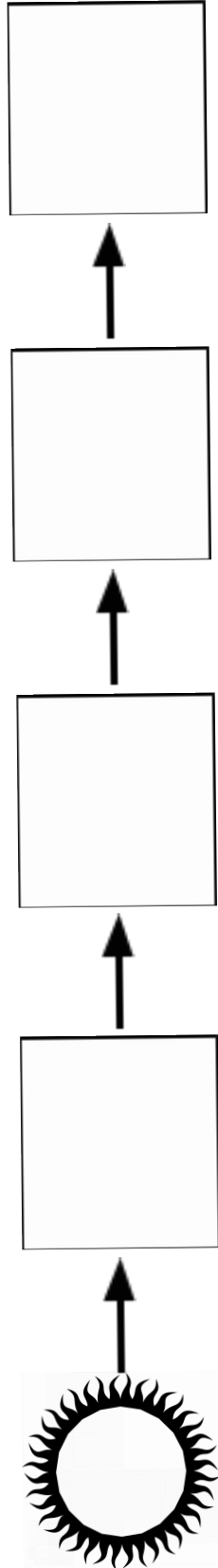
1. Begin by asking students to share some types of relationships among organisms that they know about.  
**Most students will come up with predator/prey relationships. Discuss with students the other relationships: parasitism, mutualism, and commensalism.**
2. Explain that they will get the opportunity to explore these different relationships using iNaturalist.
3. Have students open up [www.iNaturalist.org](http://www.iNaturalist.org) in a browser and select **Explore**. Explain to students that they will explore by location or specific organism to find a photo of each of the four different relationships: predator/prey, mutualism, parasitism, and commensalism.
4. Once they have found a photo, students will sketch the photo and describe the organisms and their relationship on SD 2.

### Formative Assessment/ Guided Practice

1. Draw a food web that includes one of the relationships you noticed.
2. Label all organisms and their role in the food web.

SD 1

# Simple Food Chain

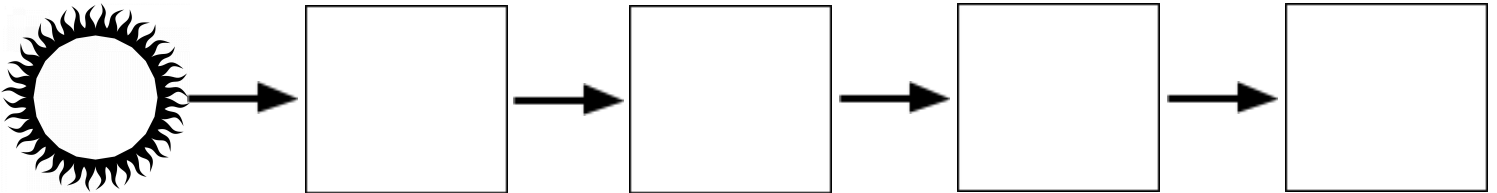


SD 2 pg. 1 of 3 Food Chain & Food Web Student Activity Sheet

Name:

**Food Chains & Food Webs**

In the boxes below, write the name of or draw the animals from the food chain you created.



Label each organism in your food chain as a producer, a primary consumer, secondary consumer, or tertiary consumer.

Add another organism card to your food chain. What type of organism is it (producer, primary consumer, secondary consumer, or tertiary consumer)? Explain your reasoning.

Using all of your cards create a food web, and draw it. There are many different ways that you can create your food web. Pay attention to the direction of the arrows!

## **SD 2 pg. 2 of 3 Food Chain & Food Web Student Activity Sheet**

### **Exploring Your School Grounds**

Predict what type of producers, consumers, and decomposers you may find on your school grounds.

**Producer**

**Consumer**

**Decomposer**

Create a food web with all of the class observations

Use iNaturalist data points to add to your food web. Once your food web is complete, write a paragraph describing how your food web works and what might impact your food web, both positively and negatively.

What is a native species that you would like to see in your school yard?

What habitat would that species need to have and what are some simple habitat additions/improvements that you could make on your school grounds to create a welcoming environment for the species?



**SD 2 pg. 3 of 3 Food Chain & Food Web Student Activity Sheet**

Find a photo of each of the four different relationships. Sketch the photo below and describe the organisms and their relationship.

**Predator/Prey**

**Mutualism**

**Parasitism**

**Commensalism**

**SD 3**

**School Ground Observation Sheet**

1. Following your teacher's guidance, make observations of your school grounds. **Every organism is a NEW observation**
2. Record each of your observations below. Include the name of the organism and if it is a plant, animal, fungus, or other.

**Name of Organism**

**Plant, Animal, Fungus, Other**

